

# A NEW SPECIES OF CALAMOVILFA (GRAMINEAE) FROM NORTH AMERICA<sup>1</sup>

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*Calamovilfa arcuata* K. E. Rogers, sp. nov. — Perennis, usque ad 1.5 m alta vel altior; rhizomata gracilia, brevia; nodi barbati sub annulum cum confertis mollibus adscendo-appressis pilis usque ad 8.0 mm longis; vaginae firmae, confertae, parce pubescentes in dorso cum mollibus longis in tubercula adfixis pilis vel glabrescentes; margines, praecipue apice, dense pilosi; collum circulus densus e longis albis pilis compositus; panicula aperta, purpurea, 15-45 cm longa, 8-40 cm lata; rami primarii patentem denum adscendentes, superne apice pilosi; pulvini pilosi vel pubescentes; spiculae anguste lanceolatae, purpureo colore tinctae, 6.0-7.4 mm longae; gluma prima ovato-lanceolata, acuta, acuminata vel aristo-aculeata, plerumque arcuata, 2.7-4.1 mm longa; gluma secunda ovato-lanceolata, acuminata vel etiam aristo-aculeata, arcuata, 4.2-5.4 mm longa; lemma lanceolatum, attenuatum, arcuatum, 5.5-7.0 mm longum, usque ad 2 mm paleam superans; palea lanceolata, attenuata, 5.4-6.2 mm longa, binervis, inter nervos sulcata, pubescens vel pilosa in parte inter nervos, apice breviter bifid scaberuloque.

Perennial, up to 1.5 m or more tall; rhizomes slender, short, brownish, as much as 5.0 mm thick; culms densely tufted, erect, unbranched, round or slightly subcompressed, smooth or slightly scaberulous below the nodes; nodes bearded below the annulus with soft ascending-appressed hairs up to 8.0 mm long; sheaths firm, close, sparsely pubescent on the surface with long, soft tubercle-based hairs or glabrescent, the hairs persistent and dense along the margins and at the apex; sheaths overlapping and persistent at the base, becoming shorter than the internodes above, mostly 6-15 cm long (or the uppermost as much as 22 cm long); collar a dense ring of long, white hairs; ligule erose-ciliate, whitish, convex, 0.2-0.7 mm long, the cilia less than 0.5 mm long; blades flat, linear, attenuate to a slender, thread-like involute point, articulated with the sheaths by a narrow line, 30-85 cm long, 1.5-6.5 mm wide, firm, the nerves approximate, the upper surface bearing soft hairs up to 5.0 mm long, these dense behind the ligule, the surface becoming glabrate toward the apex, the lower surface sparsely pilose toward the base or glabrous; margins of the blades narrowly white cartilaginous, antorsely scabrid except at the ciliate base.

Panicle terminal, open, purplish, 15-45 cm long, 8-40 cm wide; peduncle 15-38 cm long; primary branches solitary and alternate or

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some of them paired at the nodes, slender, spreading or ascending, pilose or pubescent in the axils, more or less scabrid on the angles, the lowermost as much as 22 cm long; secondary branches ascending, 2-11 cm long; tertiary branches ascending, 2-8 cm long; rachis angled, the angles scaberulous or scabrid; pulvini pilose or pubescent; spikelets paired and solitary, appressed-ascending, narrowly lanceolate, acuminate, tinged with purple, 6.0-7.4 mm long; pedicels scabrid to nearly smooth, the longer of a pair 2.5-8.0 mm long, the shorter 1.0-2.0 mm long; glumes, lemma and palea firm; first glume ovate-lanceolate, acute, acuminate or awn-pointed, usually arcuate, 2.7-4.1 mm long, 1-nerved, the nerve scaberulous on the upper portion; second glume ovate-lanceolate, acuminate or awn-pointed, arcuate, 4.2-5.4 mm long, 1-nerved, the nerve scaberulous on the upper portion; lemma lanceolate, attenuate, arcuate, 5.5-7.0 mm long, 1-nerved, pubescent or pilose on and along the midnerve for  $\frac{1}{2}$  to  $\frac{2}{3}$  its length; callus bearded with white hairs, the hairs 2.0-2.5 mm long, 0.32 to 0.42 the length of the lemma; palea to 2 mm shorter than the lemma, lanceolate, attenuate, 5.4-6.2 mm long, 2-nerved, furrowed between the nerves and pubescent or pilose on and between the nerves, the apex shallowly bifid and scaberulous; stamens 3.0 mm long.

TYPE: TENNESSEE. CUMBERLAND CO.: about 8 miles north-northeast of Crab Orchard, off the old gravel road from Crab Orchard to Rockwood, downstream about 600-800 feet from Antioch Bridge over Daddy's Creek, in a shrub-dominated community, October 3, 1968, *Rogers, Sharp, Delgadillo*, and *Meijer 42409* (US 281796). Isotypes at TENN, US, TAES, ISC, LAF.

Other Specimens Examined:

OKLAHOMA. PUSHMATAHA CO.: Pushmataha Wildlife Refuge, SE Oklahoma, *Porter s.n.*, Sept. 1968 (US).

The genus *Calamovilfa* Hack. has previously been treated as comprising four species in North America. One species, *C. curtissii* (Vasey) Scribn., is endemic to northern Florida. Two other species, *C. longifolia* (Hook.) Scribn. and *C. gigantea* (Nutt.) Scribn. and Merr., occur from southern Canada, Michigan, Indiana and Missouri west to Colorado and Idaho, and south to Texas and Arizona. A fourth species, *C. brevipilis* (Torr.) Scribn., is a coastal plain species reported to occur from New Jersey to South Carolina (Hitchcock, 1951; Gould, 1968).

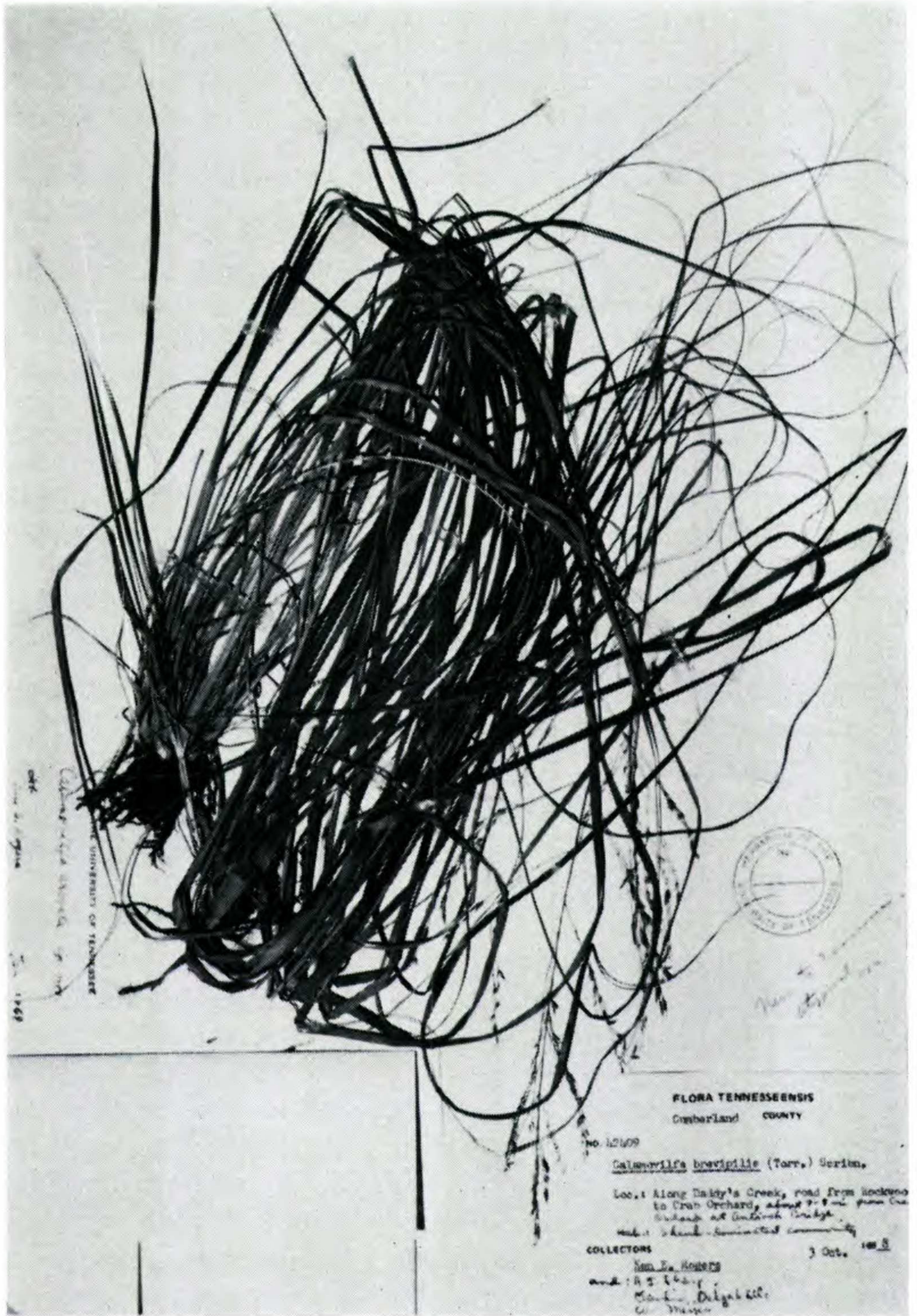


Figure 1. Photograph of *Calamovilfa arcuata* (Rogers et al 42409).

In the fall of 1968, on a plant collecting trip with other botanists to the Cumberland Plateau in Tennessee, I collected a grass which was initially thought to be either a *Panicum* or some unfamiliar grass (Figure 1). Perhaps intuitively, enough material was collected for several herbarium specimens. Later examination of the material led to a tentative identification of it as *Calamovilfa brevipilis*. The discovery of this species on the plateau, although a little surprising, was not inconceivable since a number of Coastal Plain elements occur there. I was also aware that this material was atypical of *C. brevipilis*, if not distinct from it. A number of specimens were sent to agrostologists for observation. Most agreed that it was probably an atypical form of *C. brevipilis*. Dr. Thomas R. Soderstrom, Curator of Grasses at the United States National Museum, after examining my material and a single specimen essentially identical to it from southeast Oklahoma, suggested that I describe the grass as a new species.

A careful comparison was made of *C. arcuata* with herbarium material of other species in *Calamovilfa*. I found that *C. arcuata* was apparently most closely allied to *C. brevipilis* and *C. curtissii*, and between these two it was most closely related to the former.

Thieret (1966) in his Synopsis of the genus *Calamovilfa* (Gramineae) regarded the genus as comprising two sections, Section *Calamovilfa* and Section Interior. Features of plants in the former section are short rhizomes, ligular hairs less than 0.5 mm long, a line of articulation between sheath and blade, and a distribution in the Coastal Plain of eastern United States. Extensively creeping rhizomes, ligular hairs 0.75 mm or more long, line of articulation not present between sheath and blade, and a distribution in the interior United States and Canada characterize plants of the latter section. After examining the material of *Calamovilfa* from the Cumberland Plateau in Tennessee, I concluded that it belonged to the sect. *Calamovilfa*.

Utilizing measurements taken both from herbarium specimens and those appearing in the literature, a comparison

was drawn between the species in sect. *Calamovilfa* (Table 1).

TABLE 1.

|                      | <i>C. brevipilis</i>                              | <i>C. arcuata</i>   | <i>C. curtissii</i>   |
|----------------------|---|---|---|
| nodes                | glabrous  | pilose  | glabrous  |
| sheaths              |   |   |   |
| indumentum           | glabrous or slightly pubescent at the apex        | margins pilose; surface pilose or glabrescent                                       | sparsely pilose or glabrescent  |
| collar               | glabrous  | pilose  | glabrous or sparsely pilose   |
| ligule, length       | 0.2-0.4 mm  | 0.3-0.7 mm  | 0.3-0.4 mm  |
| blades, indumentum   | upper surface sparsely pilose at base             | upper surface densely pilose at base, the rest of the surface pilose to glabrescent | upper surface pilose at base, the rest of the surface pilose to glabrescent |
| panicle              | open; branches spreading to ascending             | open; branches spreading to ascending   | contracted; branches appressed  |
| pulvini              | glabrous  | pubescent or pilose   | glabrous  |
| spikelet, length     | 4.0-5.8 mm  | 6.0-7.4 mm  | 3.7-5.6 mm  |
| glumes, shape        | acute, not arcuate                                | acute to acuminate, arcuate   | acute, not arcuate  |
| lemma                |   |   |   |
| length               | 4.0-5.4 mm  | 5.3-7.2 mm  | 3.5-5.2 mm  |
| shape                | acuminate, not arcuate                            | attenuate, arcuate  | acute, not arcuate  |
| palea, length        | 3.8-5.3 mm  | 5.3-6.2 mm  | 3.5-5.0 mm  |
| lemma/palea          | subequal or nearly so, or palea longer than lemma | lemma longer than palea   | subequal  |
| callus hairs, length | 1.5 mm  | 2.0-2.5 mm  | 1.0-1.5 mm  |

The above comparison of species illustrates that *C. arcuata* is clearly separated from *C. curtissii* by the open panicle with spreading to ascending branches and the larger spikelets which are 6.0 mm. or more long. *C. curtissii* has a contracted panicle with appressed branches and spikelets not more than 5.6 mm long. *C. arcuata* is distinguished from *C. brevipilis*, and in most cases from *C. curtissii*, by the pilose nodes, the pilose sheaths (at least marginally), the denser indumentum behind the ligule at the base of the blade, the pubescent or pilose pulvini, the arcuate glumes and lemma, the longer lemma and palea, the lemma exceeding the palea rather conspicuously, the longer callus hairs, and the larger spikelets.

The specific epithet *arcuata* refers to the unique outwardly curved glumes and lemma (Figure 2).

In the single caryopsis of *C. arcuata* available for study it was clear that the pericarp and testa were not adherent upon soaking in water. This observation corroborates that of Reeder and Ellington (1960) with regard to caryopses in the genus.

Knowledge of the habitat of *C. arcuata* is limited by the absence of precise information about the ecology of the Oklahoma material. However, I have had an opportunity to observe closely the habitat of the Tennessee population, both at the time it was first collected, and later when I revisited the area in December, 1968. Thus far, only a single population of *C. arcuata* has been found in Tennessee. It appears to be a well established population, numbering some 25 to 30 or more individuals growing separately and gregariously. The plants are growing on rather thin, recent siliceous alluvium overlying sandstone rock. This area projects into Daddy's Creek about 30-60 feet and has a length of 100 feet or so, and is dominated by shrubs under which there are numerous herbaceous plants. There is only a scattering of small trees. The surrounding area has a maturely dissected topography on which there are rich deciduous woods interspersed with pine. A list of the principal plants associated with *C. arcuata*, arranged approximately in their decreasing

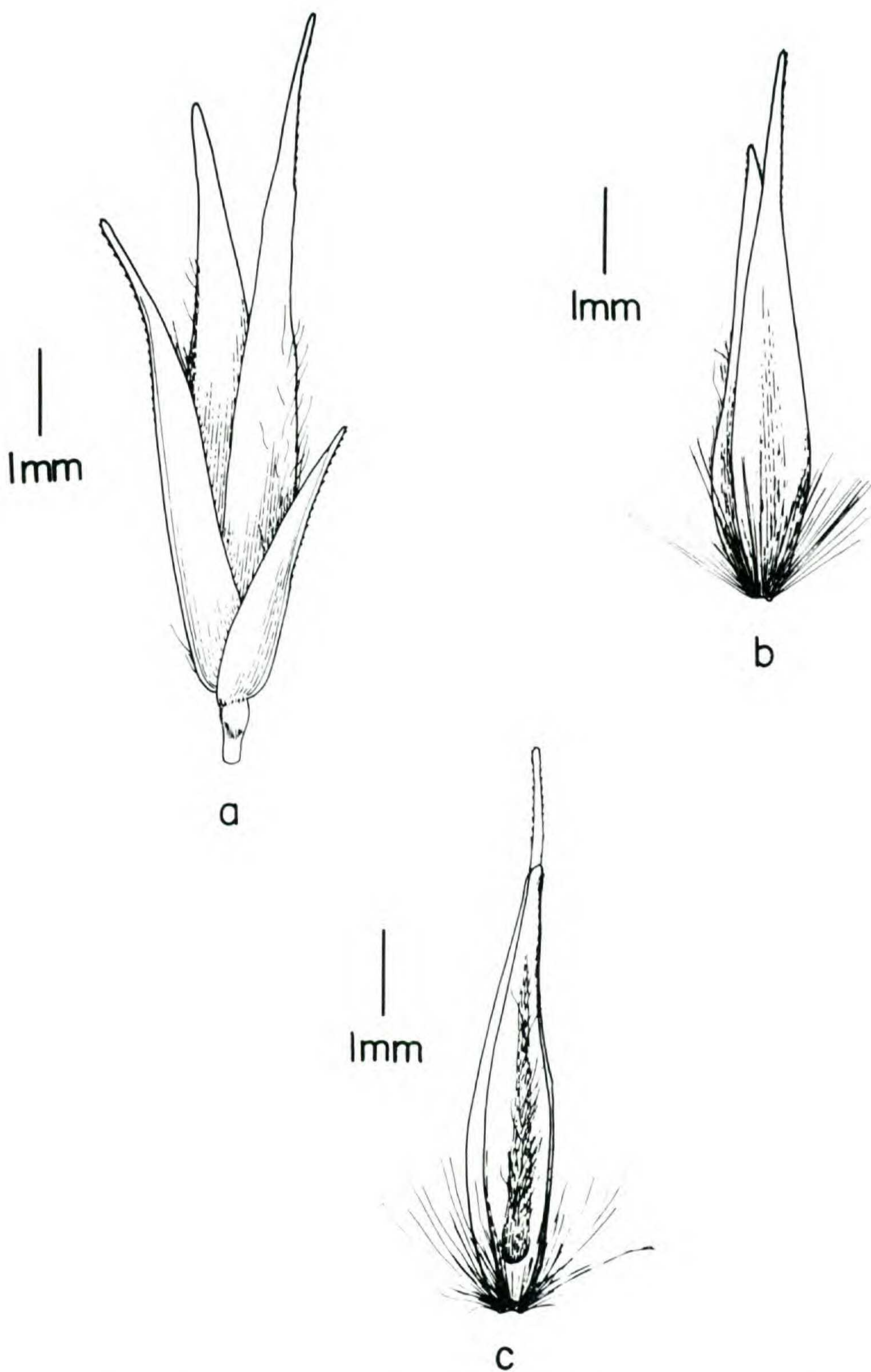


Figure 2. Photograph of drawings of *Calamovilfa arcuata*: a, spikelet,  $\times 25$ ; b, c, floret,  $\times 25$ .

order of importance in the plant community, is given in Table 2.

TABLE 2.

List of principal flowering plants associated with *C. arcuata*, Daddy's Creek, Cumberland County, Tennessee

| <i>Shrubs</i>                            | <i>Trees</i>                                   |
|--|--|
| <i>Cornus amomum</i> Miller              | <i>Liquidambar styraciflua</i> L.              |
| <i>Alnus serrulata</i><br>(Aiton) Willd. | <i>Acer rubrum</i> L.                          |
| <i>Hypericum prolificum</i> L.           | <i>Pinus virginiana</i> Miller                 |
| <i>Itea virginica</i> L.                 | <i>Nyssa sylvatica</i> Marshall                |
| <i>Sambucus canadensis</i> L.            | <i>Diospyros virginiana</i> L.                 |
| <i>Ilex verticillata</i><br>(L.) Gray    | <i>Fraxinus</i> sp.                            |
| <i>Rosa palustris</i> Marsh              |  |
| <i>Rhododendron</i> sp. (azalea)         |  |
| <i>Herbs</i>                             |  |
| <i>Andropogon gerardii</i><br>Vitman     | <i>Carex</i> sp.                               |
| <i>Andropogon scoparius</i><br>Michx.    | <i>Bromus purgans</i> L.                       |
| <i>Panicum microcarpon</i> Muhl.         | <i>Elymus villosus</i> Muhl.                   |
| <i>Panicum clandestinum</i> L.           | <i>Lycopus americanus</i> Muhl.                |
| <i>Solidago rugosa</i> Miller            | <i>Oxypolis rigidior</i> (L.) Raf.             |
| <i>Eupatorium fistulosum</i><br>Barratt  | <i>Scutellaria</i> sp.                         |
| <i>Lobelia cardinalis</i> L.             | <i>Muhlenbergia sylvatica</i><br>(Torr.) Torr. |
|  | <i>Xyris torta</i> Smith                       |
|  | <i>Aster dumosus</i> L.                        |

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LITERATURE CITED

- GOULD, FRANK W. 1968. Grass Systematics. McGraw-Hill, New York. 382 p.
- HITCHCOCK, A. S. 1935. Manual of the Grasses of the United States. U. S. Dept. Agr. Misc. Publ. 200, 1040 pp., illus. (rev. 1951 by Agnes Chase, 1071 pp., illus.).
- REEDER, J. R. and M. A. ELLINGTON. 1960. *Calamovilfa*, a Misplaced Genus of Gramineae. *Brittonia* 12(1): 71-77.
- THIERET, JOHN W. 1966. Synopsis of the Genus *Calamovilfa* (Gramineae). *Castanea* 31: 145-152.